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Quarantine Against Destructive Insects and Plant Diseases.

NOT long ago a correspondent in Denver wrote that a considerable portion of the oranges which he found in that market contained worms, which he described in a general way as resembling those found in chestnuts. We at once wrote him to send us specimens of the infested fruit, if possible, but, although we have not received them, there can be little doubt that this is the larva of the well-known orange-worm, Trypeta ludens, which is known to infest oranges in certain districts of Mexico. Professor Cockerell, of the New Mexico Agricultural Experiment Station, in a paper just received, asserts that the oranges from Morelos, Mexico, a district where this insect prevails, have been shipped in considerable quantities into this country during the present season. The shortage of the Florida crop has kept oranges at a price that makes it profitable to export them from that district, and this will explain their occurrence in this country. Few oranges from this part of Mexico come to this port, for they are fit to market at about the time when the Jamaica crop is in season, and with this they cannot profitably compete, but it paid this year to ship them to western cities, and undoubtedly this accounts for their appearance in Denver. As the matter stands, no one need be surprised to find that this insect has secured a foothold during the present year in the orange groves of Florida and California. Orange growers already have enough to contend with, and there is no demand for fresh troubles imported from Mexico or elsewhere, and no one knows how serious a loss might follow the introduction of a new and active enemy.

Professor Cockerell has already written for this journal many articles concerning the scale insects which are imported with fruit, fruit-trees and ornamental plants. In the essay mentioned above he alludes to the well-known fact that our most harmful insects are immigrants, and that we do not know how a species will behave when it reaches a strange land and finds itself under conditions different from those at home. Without its natural checks it may increase inordinately, as did the cottony scale in California. Insects and fungi which infest one plant in one country may find new food in another. We can place no trust in climatic barriers, for not only can many insects endure great differences of temperature, but they may soon adjust themselves to a new environment, and when Professor Cockerell affirms that scale insects alone, which threaten disaster to our orchards and vineyards, come from all quarters of the globe, the statement is the result of calm scientific judgment based on absolute knowledge, and not the outcome of any childish panic.

Now, there is nothing new in the situation at present, and this threatened invasion of the orange-worm we only use as a text to invite attention to the general fact that while insects and fungi are destroying the crops in this country to the value of a million and a half of dollars every day, there are, perhaps, scores of other larvæ and disease-breeding fungi which would prove quite as destructive as any that are now ravaging our crops if they once obtained a foothold here. And what are we to do about it? Of course, the first thought is a quarantine to prohibit importation into this country of any diseased or insect-infested fruit, tree, plant, cutting or seed; and since it is a national matter the obvious suggestion is that this should be a United States law. Indeed, we have received with Professor Cockerell's essay the draft of a bill which it is proposed to present to Congress at the next session. In a general way this provides that all trees, fruits and other horticultural products should only be allowed to enter the United States at certain ports and under regulations prescribed by the General Government; that all these articles shall be examined by inspectors for such ports, and if clean they shall be entitled to a certificate from such inspector and delivered to the consignee; but if infested with any insect or the germs of any disease they must be shipped back from whence they came or be destroyed within three days from the time of inspection. Now, there is little doubt that Mr. Craw, the efficient inspector of the California quarantine, has done much to protect our horticultural interests from dangerous insects which have entered California ports from Japan, the Sandwich Islands, China, New Zealand, Australia and Mexico, but, of course, the country is not adequately protected with an inspector at one port on the Pacific Ocean. But the difficulty of devising a law for the whole country which shall at once be constitutional and effective is serious, as we have more than once pointed out. Individual states may take action to head off these invasions, but the obstacles in the way of controlling traffic between states seem almost insurmountable. It would seem that Congress ought to be able to shut out the infested oranges of Mexico by a prohibitive tariff, or in some more direct way, just as Germany excludes American pork. But, in order to organize a campaign against this or any specific pest, we must know the dangerous insects and know where they are. It would seem, as Professor Cockerell suggests, that in every country from which we receive plants a competent entomologist should be stationed to determine the presence of pests and warn the people of their probable advent. Professor Townsend's recent travels in Mexico for this very purpose show how much there is to be done, and these traveling entomologists might, whenever the conditions warrant it, inspect the quarantine stations at home and help to keep them in a proper state of efficiency.

The appearance of this Morelos orange-worm illustrates precisely what such an agent might do, for it is only by actually visiting Mexico that it could be ascertained where the infested oranges grow, and once having that information we could have protected ourselves if we had possessed the necessary machinery on the border. Mr. Craw's late reports show that about half the plants which arrive in San Francisco are infested with scales or other insects, and Professor Cockerell is constantly finding new ones. He does not think it necessary that quarantine officers should be skilled entomologists, but holds that any man with sharp eyes, a ready memory, clear printed directions and a set of specimens of the commoner insects could be trusted to guard our interests. We do not coincide with this view.

We consider it absolutely essential that a quarantine officer, if such a position is created, ought to have a considerable knowledge of entomology, with special training and experience.

This whole subject, we are glad to learn, will be discussed at the coming National Fruit Growers' Convention. We cannot afford to sit idly by and allow these repeated attacks upon agricultural industries in their present depressed condition. Fruit growers, truck raisers and the growers of staple farm crops have all they can do to secure a living from the soil. The people who glibly give advice to them "to go into something else," that is, to turn their truck farms into small fruit farms, to abandon the raising of small fruits for dairy products, or to plant vineyards instead of orchards, do not realize how depressing it is to be compelled to revolutionize an entire system of farm economy when the old way is threatened by a glut in the market or by the appearance of some new enemy. It is to be hoped that some means can be devised for the suppression by public authority of pests when they pass beyond the control of individuals. But we must repeat that no more delicate problem than this has ever been presented either to state or national legislation. Some phases of this problem were stated on page 401, in volume vi. of this journal, and we have often discussed the particular cases of the general question. Even if all the fruit, and seeds, and bulbs and plants imported into this country were subjected to rigid inspection it must be remembered that the germs of disease, the seeds of evil weeds and the eggs of noxious insects can be imported in a thousand other ways. When once here the difficulties of preventing their transportation into adjacent states arise, and a spirit of hostility, and perhaps of retaliation, is at once kindled by any attempt to prevent the transportation of infected nursery stock from one part of this country to another. One thing the General Government can do, and the state governments ought to aid it in every way possible, and that is to give moral and financial support to institutions where the scientific study of the contagious diseases of plants and of pestiferous insects is prosecuted, and to give substantial help to the stations where experiments are made to discover the most effective means of eradicating them. The more that is learned about these enemies, and the more widely such knowledge is disseminated, the more certainly we may look for a strong and enlightened public sentiment on this subject, and, after all, this is the one condition essential to the enforcement of a quarantine law or any other direct legislation for the extirpation of infectious diseases or insects.

Second-growth White Pine in Pennsylvania.

DURING a recent trip through Elk, Forest, Jefferson and Clearfield Counties, Pennsylvania, I was repeatedly told that the White Pine never followed itself in forest renewal; that on White Pine lands from which the timber was removed a vigorous growth of hardwoods would appear, but that Pine never came again on such lands, or at least not until the hardwoods had prepared the soil for a second crop of Pine. Among others a leading lumberman of Elk County held strenuously to this doctrine, and this gave an added interest to the examination of the woods. My first stopping-place, after the interview with the Elk County man, so completely refuted his contention that it is hoped he may visit the slashings of the Du Bois tract, and then apply the result of his observations to the care of his own extensive holdings.

In 1859 a cyclone destroyed the timber on a strip of land half a mile wide and of great extent, its path crossing the Du Bois tract in the north-west part of Clearfield County. A new growth has, of course, sprung up in the path of the storm. Upon one part of it, which by a fortuitous combination of circumstances has been protected from fire, there is a vigorous stand of young White Pine, mixed with hardwoods. Seen from an adjoining hill the Pine seems the most plentiful species, and a careful study resulted in a surprisingly small percentage, but explained measurably the erroneous theory regarding the absence of White Pine generally in second-growth timber.

An acre, believed to be representative of the protected area, was measured off and all the trees counted, resulting as follows: White Pine, 285; Aspen, 66; Beech, 138; Sugar Maple, 130; Silver Maple and Red Maple, 130; Black Oaks, 16; White Oak, 1; White Ash, 24; Cucumber Tree, 96; Black Cherry, 79; Black Birch, 432; White Birch, 12; Basswood, 6; Ironwood (Ostrya), 2; Tulip Tree, 13; Chestnut, 2; Willow, 10; Hemlock, 50.

To this list must be added a shrubby undergrowth of Alder, Blackberry and other plants.

It will be observed that of the 1,480 trees counted on the area, only 285, a little less than one-fifth, are Pines. Of this number 90 were estimated at forty feet or more in height. These Pines were the tallest trees on the acre, and this fact, coupled with their winter foliage, gave them the appearance of being the most numerous. The tallest Hemlock on the acre was hardly more than six feet, while the great majority of the Hemlocks were less than two feet high.

The age of the oldest Pines was found to be thirty-five years, showing that they sprung up within a few years of the destruction of the old growth.

An effort was made to determine the age of small Pines by pulling a number of trees up to three feet in height and counting the annual rings at the collar, using the number of whorls of branches as a check. For this purpose a "slashing" (land whence the merchantable timber has been cut) not far from the sample area above noted was carefully examined. Immediately adjoining the slashing was a splendid Pine forest, where there stood an average of thirty-five Pines to the acre, the remaining trees being Hemlock and a small admixture of hardwoods. In the slashing the ground was covered with a dense growth of Brambles, young Maples, Birch, Beech, etc., rising to a height of ten or twelve feet. It was evident that fire had not touched the tract since the timber was cut, and a careful examination revealed a number of young Pines growing healthily in the shade of the hardwoods. Unfortunately, a fall of snow prevented the counting of the little Pines on measured areas. Between forty and fifty trees were pulled, their ages determined and height accurately measured, the result being as follows: Two years old trees, 3 inches high; three years old, 5 inches; four years old, 8 inches; five years old, 10½ inches; six years old, 31 inches; seven years old, 31 inches; eight years old, 27 inches. It is not to be inferred, of course, that the growth of Pine becomes less the seventh and eighth years; it simply happened in this instance that the twelve trees of which the size was determined had not made as good growth as those of less age. It will be noted that during their first four or five years the White Pine seedlings grow very slowly, and it is easy to understand that there might arise a doubt of their ever making large trees, compared with the more rapid-growing hardwoods which shelter them. So, too, the tiny seedlings might easily escape notice entirely, and thus the false generalization with which this article is headed is explained. However, in studying the development of the young growth on the sample area above noted, it was found that the Pine begins a rapid height growth when from ten to fifteen years of age, and between the ages of fifteen and fifty years it is no unusual thing for it to increase in height from two to three feet in a single year. Thus we find in the slashing tiny Pines which require a sharp lookout to discover, while in the path of the cyclone, other conditions than time being similar, the lusty Pines seem to dominate all the other growth.

The two instances above cited demonstrate the ability of White Pine to reproduce itself, provided fire is kept away from it. The proviso sounds simple enough, but the thousands of desolate acres marked by charred stumps and ash-covered soil which lie between Williamsport and

Warren along the line of the Philadelphia & Erie Railroad, prove that there must be some extraordinary difficulty in protecting from fire lands that have been cut over.

Washington, D. C. *Charles A. Keffer.*

The Arrangement of Flowers.—II.

LONG-STEMMED FLOWERS.

AN equally important class of flowers for table decoration are the long-stemmed flowers. Two flowers prominent in most gardens, poppies and roses, may be taken as examples. I like the clear, slender glass vases for flowers, especially the ones that show the leaves and stems down to the base. Highly ornamental vases of any description are not appropriate, and the flowers themselves must be the conspicuous feature. There are, of course, exceptions. At a luncheon the central decoration of the table was a succession of little Dresden lords and ladies holding pictures and cornucopias as large as themselves, in which were a few rare roses and Orchids. The effect was pleasing, but these choice flowers, unlike our ordinary garden flowers, seem to harmonize with costly porcelain. Hare-bells and Trailing Arbutus would have looked altogether out of place in the same vases. Winter hot-house flowers show to good advantage in Bohemian cut glass and other handsome vases. In summer, in the country, for flowers of the fields and woods the vases should accord with the house and surroundings; but no positive rule can be laid down for appropriateness or good taste in their choice, and good sense is the safest guide. It is difficult to arrange flowers to have an artistic effect in a rose-bowl. The principle of the rose-bowl is wrong, and a vase should be smaller at the bottom than at the top. The tall, slender green or white vases which look like huge morning-glory blossoms are beautiful for flowers as well as appropriate. The flowers grow in this way, the bushes small at the base and broader toward the top. A Poppy garden should contain fancy grasses, and no arrangement of poppies is perfect without some of these, while oats, wheat and timothy contribute to a harmonious effect. Only a few poppies should be placed in a vase, so that the effect may be light and delicate. They are a fairy-like flower, and the spirit of the flower should be carried into the arrangement. As many as sixteen tall, slender lemonade glasses may be disposed on the table for only about fifty poppies. The finished effect is that of poppies growing, and each delicate petal shows to its best advantage. Any number of glasses may be placed in some definite order down the centre of the table, such as first a central one, then four surrounding it, then a chain of three at the two ends of the square. The grasses should be put in highest at the centre, leaning first one way and then another, just as they grow. The highest poppies also should be placed in the centre, and perhaps the darkest ones, and the lighter and smaller ones used until the small glasses at the ends of the chain hold the finest and most delicate of all. Fewer flowers are required for an arrangement of this sort than one would think, and showy displays may be made with no more blossoms than are sometimes seen crowded into one vase, when the only effect is a mass of color.

Roses may be treated in much the same way, substituting Maiden-hair or other Ferns for the grasses, or using only their own beautiful waxy leaves.

Rangeley, Me. *Dorothy Root.*

The Islands of Lake Champlain.

IT has long been an accepted notion that the shores and islands of our great lakes offer special advantages in fruit-growing. Some of the most noted localities in America for the production of apples, peaches and grapes lie along or in the Five Great Lakes. Lake Champlain ranks in size below only these, yet contains an island area greater than any. The fruit-growing industries on the Champlain islands, however, have but recently begun the course of development for which the location gives so much promise. But apple-growing is now gaining rapid headway, and it seems probable that fruit-raising will soon be the distinctive industry of the islands.

Several of the smaller islands along the western shore belong to the state of New York, but the greater islands are all parts of Vermont. These are principally included in Grand Isle County, which is the north-western county of the state. The whole of this county is surrounded by the waters of Lake Champlain, except a narrow neck which connects the town of Alburgh with Canada. Grand Isle County consists of three large islands and the peninsula mentioned, together with several unimportant smaller islands. This constitutes an insular area of eighty-two square miles, of which 47,250 acres are in farms (Census of 1890). Alburgh, the peninsula town, is considerably the largest one in the county. The island of South Hero has an area of about 20,000 acres, is about twelve miles long, and varies from one-fourth to five miles in width. North Hero is a long, narrow island of irregular form, containing 6,272 acres. Isle La Motte is two miles wide and six miles long, containing 4,640 acres. These islands are separated from each other by very narrow straits at certain points, and from the mainland by a width of water varying from half a mile to several miles.

There can be no question but that the surrounding waters of Lake Champlain materially modify the climate to the favorable prejudice of fruit-growing. There seems to be no satisfactory way, however, of measuring the extent of this modification except by its effects on plant-life. Such purposes of comparison may be served by stating that such apples as Northern Spy, Rhode Island Greening and Ben Davis thrive, while Baldwins are not long-lived, and King of Tompkins County is decidedly uncertain. Last winter all fruit-buds of Japanese and Domestica varieties were frozen, but this is unusual. Peaches have been grown under special protection.

Vermont Experiment Station. *F. A. Waugh.*

Entomological.

The Strawberry-root Louse, Aphis forbesi.

THE Strawberry-root louse is found throughout the state of Delaware and probably throughout the peninsula, although it has attracted attention only in a few localities, and too often the grower of Strawberries is not sufficiently intimate with the pest to detect its presence until his plantation is practically ruined. To one who knows it, however, its presence or absence is generally revealed as soon as a plantation is entered. Bare spaces scattered throughout the field at once arouse suspicion, but when it has intrenched itself in sufficient numbers to attract attention to its actual devastation, the Strawberry-bed will disappear with remarkable rapidity. In a plot at the station, containing about seventy-five varieties, which were in a flourishing condition in the spring of 1896, there are not a dozen varieties remaining.

This louse is a small dark bluish green insect, oval in shape, which gathers in great numbers on the roots and often in the crown of the plant, and there pumps out the juice. The eggs can also be seen in both of these situations, and are minute, oblong, shiny black bodies. The aphis is attended by a small brown ant (Lasius aliensis), which probably bears the same relation to this species as it does to the Corn-root louse. I am not aware that any winged form has been discovered, and its passage from field to field must be slow, or practically impossible. The most practical form of treatment at present is in the rotation of crops, whereby the aphis may be starved out. The most probable means of distribution is by infected plants coming from the nursery, where its presence has not even been suspected. It is easily treated on nursery stock with bisulphide of carbon, kerosene emulsion or tobacco-water.

The life history of the aphis has not been carefully worked out. It was first discovered and figured by Pro-

fessor S. A. Forbes, of Illinois, in his Thirteenth Report, page 102, but the specific name, forbesi, was not given to it until 1889, when Professor Weed, of the Ohio Station, vol. ii., No. 6, named it in honor of Professor Forbes.

Newark, Del. *G. Harold Powell.*

Foreign Correspondence.

London Letter.

Saxifraga Stracheyi.—This plant was introduced from the Himalayas fifty years ago, since when it has always been grown here and there in a sheltered place on the rockery, where it produces its large corymbose clusters of red flowers in April or May. It also proves to be an excellent plant for pot-culture to flower under glass in February. The thick fleshy rhizomes are established in pots during the summer, which is easily done, and they are kept in an unheated frame till January, when they are placed in a temperature of about fifty degrees in a light position. This induces them to push up their flowers, and by the middle of February plants in six-inch pots have from three to six clusters, as large as an ordinary bunch of grapes, of rosy pink flowers. The only defect they have is due to the absence of leaves, which do not develop till after the flowers have faded, but this defect is easily remedied by a little arrangement. Saxifraga ligulata may be grown in the same way, and it develops its leaves at the same time as the flowers; the latter are pure white when forced.

Spring-flowering Irises.—Given a mild winter, we have Irises in bloom in the open air all through the winter. Herr Max Leichtlin notes the flowering of the charming little I. Histrio with him in November last. I have seen it in bloom several times since Christmas, and at the last meeting of the Royal Horticultural Society (February 9th) it was shown in beautiful condition by Messrs. Wallace, of Colchester. We have beds of I. reticulata in full flower on our lawns now, and in other parts of the garden the allied I. Bakeriana, I. histrioides, I. Krelagei, I. sophenensis, I. Vartani and I. Kolpakowskiana have been lately or are now flowering nicely. These Irises belong to the same category as Snowdrops, Snowflakes, Winter Aconites, blue Squills, Chionodoxas and early Crocuses in their value for early spring effects. They are easily managed, they flower freely, and they are of the most charming shades of blue. We cannot have too many of such plants in gardens where they will do in the open, and where they will not they are worthy of frame culture. It is singular that our earliest spring flowers are blue or white, followed by yellow.

Crocus Susianus, better known in gardens as C. reticulatus or the Cloth of Gold Crocus, is a variable species and one of the forms is decidedly distinct and beautiful among the many species of spring-flowering Crocuses in bloom with us now. The leaves are short, the flowers are of medium size and short-stalked, and the upper or inflated part of the tube is of a rich orange-yellow color, the outer segments being covered with almost confluent streaks of brown-purple. In dull weather the segments do not close upward, as in other kinds, but they curl down and inward, or revolutely, so that they are always attractive. Probably this character was recognized by Haworth when he named this species C. revoluta. It is a native of the hills of the Crimea and of Asia Minor. This must not be confounded with the common yellow or Dutch Crocus of gardens, the flowers of which also are striped with brown outside, but which are larger, coarser, of a different shade of yellow, and they do not possess that revolute character of segment so characteristic of C. Susianus.

The Best Snowdrops.—First I would place Galanthus nivalis, which grows wild or naturalized in many parts of this country and Ireland. It lives and multiplies among the grass under deciduous trees, and is charming in modest patches in the garden or when covering acres in the park or plantation. The largest-flowered and most striking species, however, is G. Elwesii, with which we have been familiar for twenty years, and which is now grown in large quantities in all good gardens. Here it will not live more than a year or two in grass, but in a north border we have a large colony which is as thick now as when planted three years ago. Considerable variety is shown in the size and form of the flowers and also in the width of the leaves of this species, where it is grown by the thousand. The largest flowers I have seen this year are one and a half inches long, and the widest leaf an inch. Several have developed two flowers on a scape. The third is G. Ikariæ, introduced from Smyrna in 1893, and now abundant in English collections. It has broad, bright, shining green leaves and long, pointed "drops," the inner segments being marked as in G. nivalis.

Adonis Amurensis.—I noticed this Japanese species last year when it flowered for the first time at Kew in February. It is flowering again now and is better than it was last year, the flowers being larger and of a brighter yellow. So far it has proved quite hardy. The stems, which spring in a dense cluster from the root-stock, are from nine inches to a foot high, clothed with elegant dark green feathery leaves and terminated by short-stalked Anemone-shaped flowers, two inches in diameter. It is a native of Japan, where it is a popular garden plant and is represented by a considerable number of varieties.

Tulipa violacea is the first Tulip to open its flowers this year. It is a dwarf species, related to T. sylvestris, about six inches high, the flowers two inches long and colored red-purple, with a blue-black blotch at the base of the segments. It is a native of Persia, from whence it was introduced through Herr Max Leichtlin a few years ago.

Lilium giganteum.—This stately Lily grows well along with the hardy Bamboos at Kew. A plant which flowered in 1895, and afterward yielded a quantity of seeds, offered a good opportunity for securing a big batch of seedlings; accordingly, the seeds were sown in shallow boxes in October, and these were placed in a greenhouse where Cape bulbs are grown. But the seeds did not germinate in the spring as expected, and it was conjectured that a higher temperature would wake them up. One of the boxes was removed into a tropical temperature, but even here the seeds showed no signs of vegetating. And now, after waiting sixteen months, the seeds are germinating freely, those in the cool being just as forward as those in heat. The lesson to be deduced from this is that seeds of L. giganteum sown as soon as ripe take over a year to germinate, whether sown in a tropical or cool temperature. It takes from five to seven years to grow a seedling to flowering size.

Lilium auratum.—The Japanese growers, or those who are responsible for the preparation of the bulbs for export to Europe, have not been successful this season with this popular Lily. Thousands upon thousands of the bulbs have arrived here quite rotten, so that, although the consignments have been greater than in any previous season, the number of sound bulbs actually received has been a long way below the average. Is it possible that less care is taken in the cultivation and harvesting of the bulbs than used to be the case, or is the fault in the packing? At any rate, the failure is much deplored by would-be buyers here. Has this Lily ever been tried in Bermuda? It would, if successful, prove a better venture than L. Harrisii even. I offer the suggestion for what it is worth. England alone can take hundreds of thousands of bulbs of L. auratum if the price is reasonable. L. Henryi is another Lily worth farming on a large scale.

National Viola Society.—The modest Pansy has risen to the dignity of a Society all to itself. Mr. W. Robinson, who is the President, is, no doubt, also the prime mover in this very laudable effort to develop the Pansy family, or rather to bring it into that prominence which, from its variety, merit and adaptability, it eminently deserves. The first annual meeting of the Society was held last week when it was decided to repeat the exhibition held in the gardens of the Royal Botanic Society, Regents Park, last year, when the display of Pansies, Violas, etc., was the largest of the

kind ever held in the south. I have before described the beautiful effect produced in Mr. Robinson's garden at Gravetye by planting bedding Violas of differing kinds to cover the soil of his Tea Rose beds, and I have seen equally beautiful effects obtained by using these plants for ordinary bedding. In hot dry weather they are apt to suffer unless the soil is retentive and kept moist by watering. We have now a considerable number of breeders at work among these plants.

London. *W. Watson.*

Fig. 12.—Agave attenuata.

New or Little-known Plants.

Agave attenuata.

A MAGNIFICENT specimen of this stately Agave has been in bloom for several weeks in the United States Botanic Garden at Washington, and is reproduced in the illustration on this page. This is the first time the species has flowered in Washington, and, from a rather hasty examination, it appears to be the first time it has flowered in this country. The plant now in flower was bought in Such's nursery by Mr. W. R. Smith more than twenty years ago. Its previous history is unknown, but it undoubtedly came from Mexico, the home of the species. The flowering plant differs from figures and descriptions in having a perfectly erect, stiff spike of flowers, instead of being curved. In all the other characters the plant differs very little from the description of A. attenuata. In our specimen the woody stem below the crown of leaves is four feet high and one foot in circumference at the thickest point, which is a short distance below the crown. It is marked with quadrangular scars, three to four inches wide by one inch deep. The crown, which consists of twenty or more immense leaves, is, indeed, a handsome sight, measuring as it does nearly six feet in diameter. The leaves are first erect, but when mature they are spreading, and in age drooping, the lower ones gradually falling off, leaving the peculiar scars referred to above. The larger leaves are from two and a half to three feet long, from six to eight inches broad at the widest point, which is about two-thirds of the distance from the base, gradually tapering to near the base, where they are three or four inches wide, while they rapidly taper upward into long weak spines; the leaves are very glaucous on both sides, while the margin is entire and thin, at first whitish, but in age brownish. During the flowering period the larger leaves drop off, leaving only ten to twelve, which are not more than two inches in width and two feet long. The peduncle is only about one foot long, but is very thickly covered with large leaf-like bracts, somewhat appressed, but spreading at the base, and acuminate. The flowering spike is very dense and fully five feet long; the flowers are in twos subtended by bracts; these bracts are green, attenuate, horizontal, the lower ones being five inches long. The flowers are mostly sterile, the perianth tube very short, the stamens much longer than the petals. This plant has been in bloom nearly three months, while it was nearly two months in developing its flower-spike.

The species was first described by Salm Dyck in 1834. It was afterward (1862) described by Sir William Hooker as Agave glaucescens in *The Botanical Magazine*, and is sometimes found in cultivation as A. spectabilis. It has been illustrated in *The Revue Horticole*, figs. 31 and 32 (1875); in *The Botanical Magazine*, t. 5333 (1862), and in *The Gardeners' Chronicle*, fig. 55 (1887), figs. 63 and 64 (1895). It was introduced into cultivation about 1834. It flowered first at Kew in 1861, and has flowered several times since. It is reported in *The Gardeners' Chronicle* to have flowered in the Coimbra Botanic Garden in 1886 and 1887, in the garden of Mr. Hanbury at La Mortola in 1890, in the gardens of His Majesty the King of the Belgians at Lacken in 1895.

The plant has been widely distributed in gardens, and will doubtless be frequently found in flower in the future.*

Washington, D. C. *J. N. Rose.*

Iris Hartwegii, Baker.

FREQUENT inquiries about this pretty Iris show that it is a favorite, and lead me to put on record what I know about the species.

Iris Hartwegii occurs in California at elevations of from 1,300 to 4,500 feet, in a belt almost exactly coinciding with that occupied by Pinus Lambertiana. Like this Pine, it does far better on cool, protected northerly slopes than on shallow-soiled hot slopes facing south. The fact that its large clumps die out if the surrounding Pines and shrubs are cleared off, proves that this Iris prefers the shelter, and it does well even when the needles from the Pines smother almost everything else on the ground. The tufts may be small or as much as twenty-four inches in diameter. I have seen whole slopes covered with them. The tender India-yellow color fades in the hot sun very rapidly, but a field of these flags, lit up by the rays of the sun fall-

* The most important references to the species are the following:

Agave attenuata, Salm Dyck. *Hort. Dyck.*, 303 (1834).—*Rev. Hort.*, 149, figs. 31 and 32 (1875).—*Gard. Chron.*, ser. 2, viii., 748 (1877).

Agave glaucescens, Hooker. *Bot. Mag.*, t. 5333 (1862).—*Gard. Chron.*, ser. 2, ii., 219, figs. 53 and 55 (1887); ser. 3, viii., 560 (1890); ser. 3, xvii., 457, figs. 63 and 64 (1895).

ing through the stand of Pines, is a beautiful sight. The stems range from twelve to eighteen inches at the lowest limit of the plants, to but six or eight inches at its highest range. The size of the flowers varies but slightly, though the falls and standards are somewhat reduced in the highest altitudes.

The climatic conditions under which it grows are naturally varied when so wide a range suits this species. The lowest temperature at the height where it begins to appear was 22 degrees, Fahrenheit, in eight years of observation, the highest 112 degrees. Although the seeds from which most trees of the Sugar Pine (Pinus Lambertiana) are raised have been gathered at altitudes between 3,000 and 4,000 feet, it must not be expected that Iris gathered from low limits would do equally well in eastern gardens. The dwarfed plants at 4,500 feet altitude are exposed to very severe winters, tempered only by the heavy snows which fall in those regions. At Panther Creek, Amador County, I have known snowfalls ten feet in depth, while one winter in about five may not know snow deeper than ten inches. Good drainage seems essential to the growth of this Iris, and, above all, a period of rest during the whole summer. In our Sierras, at the altitude of 1,300 feet, no rain falls after the middle of May, unless there happens to be a shower about the Fourth of July, until in fall when the advance showers of winter set in about the middle of September. The mean rainfall at 1,300 feet elevation is about thirty-five inches, most of which falls during December, January and February.

Applying these observations to eastern conditions, I would say Iris Hartwegii should have the most sunny place in the garden, unless your summer equals the extreme heat I have recorded. It should be well up on a slope, above a rock wall, or in a similar position, and kept from freezing too deep in the ground. While there are far more gorgeous Irises to be found, and most of them are more easy of cultivation, it is the charm of succeeding with what seems refractory which will add greatly to the pleasure of cultivating Iris Hartwegii.

Berkeley, Calif. *George Hansen.*

Cultural Department.

Notes on Hardy Plants.

MANY hardy plants in cultivation are valued mainly because they come into bloom very early in spring, when there is a dearth of bloom outside of the greenhouse, or because they bloom late, when most other flowers are past. Helianthus Maximiliani belongs to a very late-blooming class; it hardly matures its flowers here in Vermont, and it never seeds here. It seems quite hardy, and, if not so late, would be a good plant for this section. Its lateness should be in its favor a little farther south. It never has had a chance to develop its full height here, but I understand that it grows to be eight feet or more high in the latitude of New York.

One of the best Sunflowers I have tried here is the Willow-leaved Helianthus, H. orgyalis. It is a tall and stately plant, which, under favorable conditions, attains a height of eight and ten feet. It is also late in blooming, but its flowers come to maturity here. These are orange-yellow, not large, but numerous, borne in large panicles, and they last a long time. It takes more than a severe frost to injure them, and nothing short of a freeze which kills most plants seems to affect it. The long stems are well set with narrow drooping leaves, which give it an attractive appearance during the entire growing season and until winter has fully set in. This continuous attraction throughout the season is seldom found in hardy perennials. The plant shows to best advantage when massed in a round bed. It spreads from the root quite rapidly, and a few plants soon form a large clump.

Erigeron glaucus, of western North America, has much to commend it to growers of hardy perennials. In good garden soil it attains a height of ten to fifteen inches, and bears good-sized flower-heads of a purplish hue. It needs only ordinary garden soil to succeed.

The Willow-leaved Ox-eye, Buphthalmum salicifolium, of Australia, grows a foot and a half high, with good-sized flower-heads of Daisy-like shape, resembling those of Coreopsis lanceolata, but of a deeper orange shade. It is perfectly hardy here and grows freely without extra care. It blooms in early summer and continues for a considerable time.

For rock-work in full sunlight, or in sunlight half the day, the Barrenworts (Epimediums) make a pretty group. E. violaceum, which is a variety of E. macranthum, is the most robust grower with me. All the species do fairly well here after they are established. The foliage is their principal attraction, though the flowers are pretty. E. niveum has delicate white flowers, and those of E. sulphureum are of a sulphur-yellow shade. Epimediums are propagated by division of the root, and this is best done in the latter part of the summer.

Charlotte, Vt. *F. H. Horsford.*

The Japanese Ampelopsis.

A FEW hints on the cultivation of this deservedly popular climber, Ampelopsis tricuspidata, or Veitchii, as it is sometimes called, are likely to be useful, especially regarding the raising of young plants; this may be done from cuttings or seeds. The latter method probably entails the least labor and trouble, but when uniformity is desired the plants must be grown from cuttings, for the seedlings are apt to vary greatly in size, in form of leaf and in vigor of growth. All the plants assume more or less gorgeous tints in fall, but the coloring varies so much that harmony can only be had from carefully selected cuttings. The cuttings should be young growing points taken with a heel toward the end of the summer, and struck in sand either in a cool propagating-bed or a cold frame, or inserted singly in small pots in a free sandy compost. They quickly strike root and become well established before the leaves fall off. They should be kept dormant through the winter and protected against severe freezing. In spring they may be planted while yet dormant, or after they have started a little.

Seeds germinate best when sown soon after they are gathered, which is usually about the beginning of November. I have seen the berries sown entire, but it is better to wash the seeds out. They should be sown in flats in a light sandy compost and lightly covered. Germination is somewhat slow, but nearly all will come sooner or later if the seeds were thoroughly ripe when gathered. The soil must not be kept too wet, or the seeds will rot after germination has taken place. The seedlings will be ready for potting into small pots about the middle of February, and it is not advisable to attempt this operation earlier, as nothing is gained by handling the plants when very small. One more shift will be required into three-inch pots; they can then be planted about the end of May, having previously been gradually hardened off. These plants are not particular as regards soil in their permanent quarters, but if it is poor where the plants are to be set it is worth the labor to remove it and replace it with soil of a better quality. The plants should be set close to a wall, and a fastening of some sort provided to keep the shoots attached until they have made sufficient growth to enable them to cling of themselves. Carefully handled young seedling plants under favorable circumstances will grow to be eight to ten feet high the first season, with an abundance of luxuriant foliage. Planted about three feet apart they will do much to beautify an unsightly wall in one season.

If the wood is not sufficiently ripened the fall after planting slight protection may be needed, otherwise this is not necessary. Branches of evergreen trees placed against the wall over the plants make a convenient covering.

Tarrytown, N. Y. *William Scott.*

Carnation Notes.

BY this time most growers will have inserted cuttings for next winter's plants; some easily rooted and quick-growing varieties, such as Daybreak, Alaska and William Scott, will still make good stock by planting-out time, but I prefer to have the main portion in somewhat earlier, as a much larger percentage of the plants will root in January and February than later in the season, when it is more difficult to avoid extremes of temperature. Our cuttings will be boxed off about the middle of March; this will allow ample time for them to make nice plants by the time they can be transferred safely to summer quarters early in May. Plants rooted during December and early in January expressly for summer flowering are now in boxes on the shelf of a cool house. The cuttings have been stopped once, and will shortly be transferred separately to three-inch pots. About the end of March they will be placed in a frame in which a few inches of warm manure has been well-tramped down and covered with a coating of coal-ashes. If potted much earlier the little plants are liable to become

pot-bound, and do not start so well when set in the open ground. A good list for outdoor flowering is the following: Mrs. Fisher, white, still the best of the whole section; Ferdinand Mangold and Sebec, crimson, the latter a seedling raised by Mr. Nicholson, of Framingham; William Scott, Nicholson and Abundance, pink; Daybreak, shrimp-pink, and two scarlet seedlings. We have not found any striped or yellow varieties which will bloom profitably, but purpose trying a few of the newer sorts this summer again.

Plants in the benches are now requiring more liberal waterings and more frequent applications of fertilizers. We prefer to allow the soil to become moderately dry before watering, and then give it a thorough soaking. Our plants were recently picked over and all decaying foliage and useless growth removed, after which a mulch of well-pulverized, but rich, manure was given, and a further and heavier mulching will be given before hot weather sets in. Every year we find something new in Carnation-culture, and one important point is that these plants will thrive on more frequent and richer applications of liquid foods than they usually receive. We must bear in mind that they have but a few inches of compost to grow in to begin with, and having already been in the benches nearly six months they have extracted most of the available nourishment from the soil. To keep them growing and flowering vigorously it is absolutely necessary to feed them well. At present I am giving liquid fertilizers once a week, using sheep manure, sulphate of ammonia and cow manure, alternately, of moderate strength. We use some soot with the manure. As the season progresses the strength of the nutriment will be increased.

Rust, which attacked one or two varieties quite badly earlier in the winter, has now almost disappeared. Diseased plants are sprayed regularly with the arsenical solution, and badly affected or decaying foliage is picked off. At this season ventilation can be freely given on most days. Carnations detest coddling, and if they enjoy a free circulation of air stouter stems and fewer burst calyces will be seen. It pays to disbud all varieties, and this practice is almost universally adopted now. Some sorts, like Jubilee, Eldorado and Daybreak, need little disbudding, but; on the other hand, McGowan, William Scott, Portia and Hector make a large quantity of side-buds, the last-named being, perhaps, the worst to handle. The flowers of some sorts, particularly those of pink shades, fade quickly when exposed to strong sunlight. Blooms of William Scott should be picked before they fully expand, or they will not hold their color, and Daybreak blooms lose their lovely shrimp-pink shade if left on the plant a day too long. All Carnations should be gathered and placed in water in a cool room some hours before being used. Florists now adopt this plan, and the blooms swell out half as large again, the stems become more rigid, and the flowers after long shipment are found in a much fresher condition than if they had been picked, packed and dispatched at once.

Complaints are heard this season from various flower markets that the popular William Scott has to some extent lost its favor with the public, and the prices realized on this variety are lower than on almost any other sort marketed. It has proved such a money-maker for the past two or three years that every florist has been tempted to grow it largely, and the markets have at times been glutted with it. Before we can afford to dispense with it, however, some superior new variety must be introduced to take its place. It is the most persistent bloomer we grow; its one drawback is that the flower fades if not picked before becoming fully expanded. It yields three times as many flowers as any other pink variety we have grown, and we do not expect to see it discarded or relegated to an inferior place for a year or two. Madame Diaz Albertini is only grown to a limited extent, and it does not bloom freely enough to be profitable. Neither does Bridesmaid, although it produces an excellent flower on a first-class stem and holds its color well. Where quality rather than quantity is desired it is worth retaining. Triumph, certificated at the Carnation Show in Boston in 1895, proves rather disappointing and does not bloom freely. Abundance has short, stiff, wiry stems; the flowers are of fair size and good color, and it is a more persistent bloomer than any other new sort I have tested. Della Fox was very rusty earlier in the season, but is now almost clean. It is not popular in this section as its color is not fancied so much as the paler and more reliable Daybreak. Its general habit is better than that of Daybreak, but it is not likely to attain anything like the popularity of that kind. In dark shades Thomas Cartledge proves reliable, but we still retain a few plants of the good old variety Tidal Wave, which, as a general rule, is rather a dwarf grower, although our plants this year yield stout stems eighteen inches long, in clayey soil. Some promising new pinks, such as Victor, Mrs. McBurney, C. A. Dana and one or two others, are offered for the first time this season. Some good scarlets appear to have been exhibited in the seedling classes at the Cincinnati Show, and a reliable scarlet sort of good size is much needed. We grow Hector chiefly, a variety raised by Mr. I. Wright, of Wellesley Hills. In color and size of flower it is all that could be desired, but it produces far too much grass and lacks strength of stem. Its flower mounted on a stem like that of Jubilee would be superb. Jubilee has proved the premier scarlet at the great Carnation Show. The flowers shown at Boston in 1895 by the raiser, Mr. E. G. Hill, had the finest stems of any variety exhibited, and at Cincinnati it has eclipsed all others of its color. We grew a few plants of it this season, which were very small when housed and did not flower until Christmas. They have produced some first-rate blooms on perfect stems and with an exquisite odor. The plants were rusty early in the season, but are now clean, and we hope to secure better results next winter from cuttings rooted earlier. Every shoot produces a flower, and after one crop is picked the plants look like stumps, but soon throw up another set of flowers. There will be no use for such small varieties as Portia and E. G. Hill where Jubilee will succeed.

Eldorado has proved the most reliable yellow variegated sort we have ever grown, and we consider it the best of its class sent out up to date. It is a very free bloomer and we have not been troubled with any burst calyces. It quite eclipses Bouton d'Or, which was one of the star yellows in 1895-6. Buttercup occasionally gives a superb flower, but it is not a persistent bloomer like Eldorado. The blooms hold fresh on the plant longer than any other sort we know; a flower kept in good condition over three weeks in February. The new variety, Mayor Pingree, raised by John Breitmeyer & Sons, Detroit, will make a strong bid for public favor next year, judging from flowers we have seen. Helen Keller this season has done the best of any of the white variegated section with us, from plants grown in heavy clay loam. Armazindy, sent out by E. G. Hill & Co. last year, has a superb stem and gives occasional exceptionally fine flowers, although the plant has rather a sprawly habit. One or two promising new sorts in this class are now being put on the market, but I do not know enough of them to venture any judgment.

Lizzie McGowan has been more widely and largely grown than any other white the past season, and the flower markets have suffered from a glut of it, as in the case of William Scott. Though inferior to some of the newer sorts in size and form, it is still an admirable all-round kind. Alaska is also good and popular, although care must be taken in propagating it to select cuttings from the cleanest and most robust plants, or there will be danger of leaf disease. Crystal, raised by Mr. Fisher, of Framingham, has a huge flower, but it bursts badly here in winter and does not prove a very free bloomer. Edith Foster, sent out by Peter Fisher & Co., Ellis, Massachusetts, is well liked where grown; the flower is not very full, but is produced on a good stem and it is quite prolific. Mrs. Fisher is still clung to by some growers, and for outdoor blooming it is indispensable. Occasionally it is seen well grown, as at Mr. Tailby's, of Wellesley, who finds it the best money-maker on his place still. Flora Hill, the champion white at Cincinnati, and Harrison's White, said to be a sport from William Scott, are two novelties likely to be tried in many places next winter. Nothing in crimsons yet beats F. Mangold with us. Meteor we will discard after two years' trial.

Taunton, Mass. *W. N. Craig.*

Hardy Ferns.—Every one who has a garden, however small, can find a place for a few hardy Ferns, particularly of our common native sorts. What they require first and above everything else is shade, and this means that they will thrive best on the eastern or northern side of a dwelling or wall, or in any other situation where the afternoon sun does not strike them fully. It is not usually best to plant them under trees, for the roots of trees rob the soil of the moisture which is needed by the Ferns, and besides this, streams of water after rains will flow down from the branches on some of the fronds much to their injury. I have an interesting and thrifty collection of native Ferns which are planted on the eastern side of a house, where they have the sunshine until noon, but after that they are in shade. Among twenty-five species and varieties which can be collected in the vicinity of Philadelphia, half a dozen are evergreen, and all of these should be planted. The best time to collect is in the late summer. They can all be found at that time, and their fronds being fully matured the height which they attain is shown, and when their size is known the proper place for them in the garden can be determined, and the room they require can be set apart for them.

It is an easy thing to get all the roots, so that they are not difficult to transplant, although, of course, it is better to take as much of a ball of earth with them as possible.

Germantown, Pa. *Joseph Meehan.*

Correspondence.

Diseases of the Snowberry.

To the Editor of Garden and Forest:

Sir,—Early in June last I observed on the leaves of my Snowberry-bushes, Symphoricarpus racemosus, a mildew which was accompanied by a black spot, affecting a portion and sometimes the entire leaf. As the fruit began to develop I noted black spots showing on the berries, and by the first of September it was impossible to find a perfect fruit, and these, with the diseased foliage, gave the shrubs a most unsightly look. About a half a mile from these diseased shrubs I had a hundred plants of the same species which were not badly infected, but they all showed symptoms of the disease in a greater or less degree. Will you be kind enough to tell me whether this is a local trouble, or whether it is one generally known? I hope to get a vigorous growth of these plants by using manure and check the disease by spraying with the Bordeaux mixture. Is this good practice?

Huntingdon Valley, N. Y. *L. F. Horner.*

[It is impossible to decide just what malady it is that has affected Mr. Horner's shrubs without examination of specimens. Dr. Halsted, to whom the inquiry was sent, states that there is a mildew, Microsphæra Symphoricarpi, which was described by Mr. E. L. Howe, of Yonkers, New York, in the fifth volume of the *Torrey Bulletin*, page 3; and manuals upon Fungi show that this mildew is not unknown in various parts of our country. It also affects other species of this genus, for Dr. Burrill records it upon Symphoricarpus vulgaris in Illinois, and Dr. Halsted has seen the same fungus on Snowberries in Pennsylvania. The black spots on the leaves are probably due to another fungus, and there is a leaf-spot, Phyllosticta, which infests the Snowberry, but it is a European species and has not been reported in the United States. There is another leaf-spot which is truly American, however, a Septoria, and it may be this which is working together with the mildew upon the foliage of Mr. Horner's plants. It is harder to suggest an identification of the disease which spots the fruit. Almost every one has seen specked Snowberries, but Dr. Halsted says that he has never made any study of the nature of this trouble, and it may be caused by any of the fungi mentioned above in connection with the mildew and the leaf-spot. Very probably these enemies can be controlled by spraying with the Bordeaux mixture if it is tried early and continued during the growing season; and since the disease is probably a widely spread one, this hint may be useful to others besides Mr. Horner.—Ed.]

The "Ramie" Fibre Plant.

To the Editor of Garden and Forest:

Sir,—For a long time this plant has caused a great deal of disappointment to would-be inventors of machinery for the preparation of its fibre for manufacturing. The machine wanted is one that will clear the fibre of gum and separate it into threads. This part of the work is done by hand in India and China, where the laborers are paid an insignificant sum for a day's work. To do it profitably in this country by hand is out of the question. The material which could be cleaned by one person in a day of ten hours would not warrant the payment of more than a few cents as wages, hence the long and tedious work of developing suitable machinery to perform the operation. Mr. S. H. Slaught, of Los Angeles, California, who has given much study to the cultivation of fibre plants and to the perfecting of machinery for their manufacture into cloth, has been in this city for some months past, endeavoring to enlist Government aid in the establishing of one or more factories to demonstrate to the people the feasibility of properly preparing the fibre. The inventor claims that the principal difficulties in the way of preparing fibre have been overcome, and that all the infant Ramie industry needs is a lift by the Government. People are slow to invest their money in this industry until it is shown by actual working experience that the project is practicable and profitable.

Much has been written concerning the different kinds of Ramie, and all agree that one of the species outstrips all the others in yielding fibre. It is called Boehmeria nivea, a plant quite common in gardens all over the south, having been disseminated widely by the Department of Agriculture for several years. It does not possess much beauty, being a tall Nettle-like-leaved herbaceous perennial, attaining a height, under favorable circumstances, of about seven feet. It is a native of China, and will not endure our northern winters unless it has protection. It has been killed outright more than once during the past thirty years in Washington, so that this may be said to be the northern limit of its hardiness. It is seemingly not overparticular as to soil or situation, and in ordinary seasons, when there is an absence of long dry spells, from two to four crops may be expected. In some recent consular reports it is stated that Ramie cannot be raised from seed. This is a mistake, as there are few plants which yield more seed than Ramie, but it takes intelligent care to raise plants by this method, as the seed is exceedingly small and the seedlings are very tiny for some time after germination. The seed cannot be expected to germinate and grow with the same treatment accorded to most farm seeds. They must be sown under cover in some simple kind of glass structure and carefully tended until large enough for the field. Should the establishing of the Ramie industry become an accomplished fact, it may be that the difficulty of raising the plants from seed will deter cultivators from adopting that method of growing it in quantity, and root division may be the most popular method. The fibre is contained in the long straight stems which rise from the roots, and the crop is fit for cutting when the part nearest the root begins to turn brown. After being harvested and denuded of its leaves, the process of decortication, which is a very simple one, is all that is required of the cultivator before delivering the crop to the factory. The decorticating process consists of breaking and stripping the woody matter from the fibre, and is done by recently improved machinery which was exhibited at work at the midwinter fair in the west. The uses to which the fibre is put are many and varied; it is made into the heaviest ropes and into cloth for every variety of use. It can be used with silk to produce the most delicate fabrics. The cloth made from the fibre is said to withstand more wear and tear than any other.

Botanic Garden, Washington, D. C. *G. W. Oliver.*

Hardy Cacti.

To the Editor of Garden and Forest:

Sir,—A few interesting native species of Cacti are found along the eastern foothills of the Colorado Rocky Mountains. They well deserve to be considered hardy, as they are frequently subjected to forty or fifty degrees of frost without harm, while the earth is bare of snow, and to the trying conditions of almost daily freezing and thawing throughout the winter. During early spring wet snows follow in close succession and keep the ground saturated at a time when so much moisture might seem unfavorable. However, the plants take advantage of this time to fill themselves with water to last during the blooming and fruiting season.

Three kinds of Opuntias are common, Opuntia fragilis and O. Rafinesquii, which are usually confined to plains bordering the foothills, and O. Missouriensis, the most showy sort, and found on high rocky ledges or hillsides.

Echinocereus viridiflorus is the most common of the globular sorts. It is usually known as Rainbow Cactus, on account of the bright-colored spines. It is found both on the hills and adjoining plains. Mamillaria vivipara is a very beautiful species, but is rare in this vicinity. The flowers are red or purple, and each of the long tubercles is tipped with a star of long bright-colored spines. Mamillaria Missouriensis is a curious sort, nearly flat, the tubercles mostly upright, with a cluster of white spines at the tip of each. The flowers are yellow and are followed by crimson berries. Echinocactus Simpsoni is a tuberculated species, seemingly intermediate between Echinocactus and Mamillaria. It is very showy at all seasons, and especially while in flower. It is also the largest of our globular sorts. It is densely interlaced with brownish purple, or sometimes yellowish spines. The flowers are rose-purple or pink, usually numerous. E. Simpsoni minor is a reduced form found in the high mountains of Colorado, and, doubtless, grows at a higher altitude (9,500 feet) than any other Cactus, latitude being considered. This differs much in appearance from the type, and does not lose its distinctive features after the two are grown under similar conditions at a lower altitude.

In the garden all of these may be well grown on a low broad

mound of coarse gravelly soil, well supplied with decomposed vegetable matter, through which small broken stone may be mingled to good advantage. The soil should be deep and with good drainage at the bottom; this is essential, as stagnant moisture at the roots must be avoided. The surface may be mulched lightly with coarse, hard gravel or pebbles, to keep the rain from spattering the plants with dirt. The bed will increase in beauty year by year, and will require but little care after the first season. The winter effect is also pleasing, and this feature alone should add in no small degree to the popularity of our hardy Cacti.

Boulder, Col. *D. M. Andrews.*

Early March in West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—Vegetation has started here unusually early, and every bright morning we are delighted by the new beauty which invests our garden. Under a great Oak in a situation unfavorable to the growth of grass, we have massed hundreds of bulbs of Narcissi, Snowdrops, Scillas, Grape Hyacinths and other sturdy early-flowering sorts, and in the grass in the open lawn we hid away Crocus bulbs last autumn, sure of finding them again when the first warm sunshine came, and now every day we are enjoying fresh surprises which nature has prepared for us overnight. Every morning we find more Tulips above the ground, more Hyacinths in the border, more Daffodils everywhere. The early birds are here, too, song sparrows, with an occasional robin, with a few blackbirds, the forerunners of the large congregation which will soon be holding their conference in the Oaks. Bluebirds are here, and Carolina wrens and redbirds are whistling like eager boys. Leaves are unfolding on the Spiræa bushes, the Hazels are hanging out their catkins, the Chimonanthus bushes are adorned with hundreds of yellow fragrant bells, the grass is green, and, in short, April is here a month ahead of time.

Rose Brake, W. Va. *Danske Dandridge.*

More About Choke Cherries.

To the Editor of GARDEN AND FOREST:

Sir,—I have never seen the Choke Cherry in this section of New Jersey, but I have seen a great many in Massachusetts, differing largely in size and quality of fruit; all, however, more decidedly astringent, with one exception. While fishing for trout in a brook which flowed through an extensive meadow I came upon one tree which produced fruit in which I could detect no astringency whatever. This was more than forty years ago, and I did not then appreciate the advantages of selecting and improving our native fruits. I do not know whether this tree is still in existence, or whether I could find it if it is, but it is quite possible similar varieties may exist elsewhere, or might be obtained from extended experiments with seedlings.

Hammonton, N. J. *William F. Bassett.*

Recent Publications.

Principles of Plant-culture. Professor E. S. Goff, Professor of Horticulture in the University of Wisconsin. Madison, Wisconsin: Published by the author.

This is an attempt to give students in an elementary form some of the reasons for the ordinary processes of cultivation. It does in reality more than that, and in a chapter on methods of manipulation it explains with some detail the practice of propagating, transplanting and pruning plants, but even here the reasons for each step are carefully presented, so that the work can be done intelligently. As the book is intended for students who have little or no previous instruction in botany, no space or effort is devoted to advanced scientific problems, but, as far as it goes, the little treatise presents to the reader or student a view which is thoroughly scientific—that is, the science of plant-culture is primarily treated, and treated as the basis of the art. Of course, a brief work like this accomplishes its highest purpose only when it is used in class work under the guidance of a trained instructor. An appendix sets forth an outline of the laboratory work which has been used by Professor Goff with his students, and although this contains only half a dozen pages, and is meant to do nothing more than suggest what can be accomplished in this line, nevertheless it clearly indicates that one who has the requisite knowledge and who is apt to teach, can make this study a most interesting one. Experiments, here only hinted at, suffice to show how the mere statements of the book can be vitalized so that they have a living and practical significance We do not mean that the book is useless without a skilled teacher, for it can be read with great profit by any young person of ordinary intelligence who wishes to familiarize himself with the so-called laws which underlie farm and garden practice, and this syllabus of laboratory work will suggest a good many ways in which he can illustrate the teachings of the book for himself. Of course, to carry out effectively the kind of instruction we refer to, some glass structure is almost indispensable, but a great deal can be done in a sunny window, and we see no reason why a book like this could not be used in certain classes of our public schools, since the only apparatus acttually needed would be a few bottles of clear glass, some graduated glass cylinders, a magnifying lens of good power, with needles and forceps and a few greenhouse pots and saucers. Any teacher who knows something of structural botany could lead his class into most interesting fields, and, indeed, a study of the principles of plant-culture could in this way be made the best practical illustration of the science of botany. In an elementary treatise like this it is very difficult to know what topics to neglect, but Professor Goff seems to have been very judicious, both in selecting and omitting. After an introduction, in which a few of the terms which most frequently occur in the treatise are defined, the circuit of plant-life is traced from the first swelling of the seed, through the development of the embryo, the penetration of the root into the damp soil, the absorption, distribution and assimilation of food, until the plant is built up to maturity, and ceases work and rests through the winter. This includes in a brief way all the processes of plant-life as they are carried on in congenial surroundings, and they suggest methods of making and preserving a favorable environment by proper cultivation. But, since the practical cultivator constantly meets adverse conditions, this is followed by a most interesting discussion of the ways in which the plant is affected by unfavorable environment, by a temperature too low or too high, by excessive or insufficient water, by too much or too little light, by an improper food supply and by parasites and weeds. After this are chapters on plant manipulation, and some brief hints on plant-breeding. Future editions will undoubtedly show that the book can be improved, but certainly the plan on which it is conceived is admirable, and no treatise of a like scope that has come under our observation has been carried out with greater success. It ought to prove an efficient help to beginners in agriculture and horticulture, since, if thoroughly mastered, it will insure an intelligent basis for further study.

Notes.

In his address before the Western New York Horticultural Society, President Barry spoke in high praise of the Jonathan as a winter apple, and a recent issue of *The Country Gentleman* speaks of it as superior in every respect to the Baldwin, and rivaled by few varieties in beauty, flavor or shipping qualities. Its slender growth seems to be an objection to the tree with many cultivators, so that nurserymen have not commended it as they might have done. But it succeeds in a wide variety of localities and it ought to be an excellent apple for the foreign trade.

A correspondent of the *American Florist* writes that the Messrs. Ellwanger & Barry have once more demonstrated that the Crimson Rambler Rose is admirably adapted for winter flowering. Strong two-year-old plants taken up from the field in autumn and potted in seven-inch pots filled with ordinary Rose soil, were full of bloom in mid-February. Many of the flower-clusters were more than six inches through, and their gay colors, with the healthy foliage, made a beautiful show. The plants were pruned back severely before potting, and the young growth pushed out from every eye. The new branches are only from ten to eighteen inches long, stiff

enough to carry the numerous flowers, but arching sufficiently to give the plant a graceful appearance. Ordinary plants carry about a dozen clusters, and they form nice bushy specimens from eighteen to twenty-four inches high and something like eighteen inches in diameter, although they were grown somewhat closely together on a bench and received no extra care.

A writer in the *Orchid Review* states that for half a dozen years he has treated his plants with ammoniacal vapor, which has increased their vigor and improved the color of the leaves of all species of Orchids. This vapor bath has been administered on Monday and Thursday nights every week after the houses have been damped down and the ventilators tightly closed. Soot and lime are used to produce the ammonia, but they are not used dry, since it has been found that there is much less danger of injury to the leaves by the use of a liquid solution which can be spread more evenly and which gives off its ammonia more slowly. A bucketful of soot and half a bucketful of lime are put into a tub with twelve gallons of water, and after being thoroughly mixed the liquid is allowed to stand for three days, when it is ready for use. No care is taken to use the clear liquid alone, but the mixture, thick and thin, is spread over the cindered stages of the houses at the rate of three gallons to a house containing 4,000 cubic feet of air space. The tub is then refilled with water, soot and lime, so that the mixture is always ready in three or four days when needed again.

Every one knows that when seed potatoes are allowed to sprout and the sprouts are broken off, as they often are when the potatoes are kept in a dark cellar, the tuber is perceptibly weakened, the yield lessened and the ripening retarded. The best way to keep seed potatoes is in cold storage, and when thus kept at the Ohio Station they came out sound and fresh, with no sprouts and with unimpaired vitality, even as late as the first of June. It is important, however, that the temperature should never fall below thirty-five, nor should it rise much above forty degrees. In a press circular sent out by the Ohio Station it is advised that the seed potatoes should be shoveled over frequently, as this prevents sprouting to a certain extent where cold storage is not available. Planters are reminded, however, that under certain conditions this sprouting process may be used to advance the early ripening of the crop. If the tubers are placed stem end down in single layers in shallow trays in a light and moderately warm room they will send out short stubby green sprouts which will remain in that condition for weeks, and if the potatoes are then planted without breaking the sprouts they will start immediately.

In one of the suburbs of Dayton, Ohio, an association has been formed for the purpose of beautifying the streets, the unimproved property and the public grounds by proper planting, by promoting a general interest in gardening, and by systematic efforts to abate nuisances and to control the location of houses so far as possible. Lectures are given, with views, to show how house surroundings can be made attractive, and the newspaper reports say that this part of Dayton has shown marked improvement in its appearance. Prizes are offered by the association for the best example of planting in individual grounds, together with the condition of the roadways, gutters, curbs, sidewalks and general appearance of the houses. Prizes are also offered to boys for the best vegetable gardens, as well as prizes open to boys and girls for the best kept back yards, whether planted with flowers, shrubbery, climbers or grass. Photographs are to be taken of the examined gardens, with particular sections and decorations of the streets entered in competition, and a neat pamphlet has been published containing views of the prize-winning grounds last year, and also embodying good advice about trees, shrubs and climbers, with the methods of planting and caring for them.

One of the useful botanical discoveries made by our experiment stations is that which traced the source of the potato scab to an infinitesimal germ that feeds on the surface of the tuber, and from this broadening of our scientific knowledge came the practical advice to use corrosive sublimate, which would kill the fungi on the tubers without injuring their growth. The remedy was so cheap and easy that many large growers have adopted this treatment as a regular part of their farm economy, but the poisonous nature of this fungicide has prevented its general use. Dr. J. C. Arthur, of the Purdue University Experiment Station therefore confers an added benefit upon farmers by the announcement that the new antiseptic known as formalin, which is not very expensive, and which is likely to become cheaper as it is better known, makes an efficient remedy for the potato scab, while it is not poisonous. Eight ounces of formalin are added to fifteen gallons of water. The seed potatoes are soaked in the solution for two hours, and then they are cut and planted as usual. Since formalin is not corrosive, it can be used in any kind of vessel, and not being poisonous no particular caution needs to be observed, except that it will make the hands smart where there are any abrasions of the skin and its fumes irritate the eyes and throat. Further information about formalin and its uses as a fungicide are promised in a bulletin which will be issued by the station in a short time.

In a letter to *The Fruitman's Guide*, of this city, from a London wholesale dealer in fruits and vegetables, an interesting variety of products is noted in that market in the latter part of February. Baldwin, Greening, Russet and Golden Russet apples came from New York and Maine, and in addition Nova Scotia was sending Northern Spies, Cranberry Pippins and Nonpareils, with Newtown Pippins from California, besides apples from France. The supply of Easter Beurre pears was from California, and Italy also furnished varieties of the same fruit, while new crop Bartlett pears, known in the English markets as Williams, were coming from the Cape of Good Hope. Packages of a dozen of the latter fruits, of exceptionally fine quality, sold at wholesale at $2.25 a package. As we stated a fortnight ago, peaches were being received from the Cape of Good Hope, during the summer season of that southern country, and new crop grapes. The demand for oranges was supplied by consignments of this fruit from Spain, Palestine, Italy and California. Tangerines, lemons and bananas were in regular supply, and 18,544 pineapples came from the Azores during the current week, from thirty-seven cents to $1.00 being realized for each of the fruits in wholesale lots. New potatoes came from Egypt, Algiers and the Canary Islands, and new asparagus from Spain and France. The choice variety locally known as French Giant sold at the extremely high price of $3.00 to $5.00 a bundle, and slender green stalks, about thirty-two to a bundle, for $1.00 to $1.37, while twenty stalks of this vegetable from Spain brought from fifty to sixty-two cents. New cauliflower was provided by Italy, France and the west of England, and there were, besides, abundant supplies of turnip tops and other greens at moderate prices.

Last year the Agricultural Experiment Station of Rhode Island made systematic tests with garden seeds to ascertain their germinating power. Of 233 samples twenty contained three or more poor seeds for every good one, and of twenty-three others more than half of the seeds would not sprout. In continuing the examination 150 more samples have been studied, and the vitality of thirty-four of these last fell below fifty per cent., which means that a purchaser of seeds would receive in most cases less than half of his money's worth in seeds that would grow. The results vary astonishingly. In some of the samples less than ten per cent. of the seed germinated, while in others more than ninety per cent. were good. If there were any uniformity in the percentage of good seed a gardener might know how thickly to sow it, since too many plants in a given space are as disastrous to a crop as too few, but no one can guess how many onion seeds he ought to sow when twelve per cent. in one sample grow, and eighty-six per cent. in another sample. In twenty-three cases seeds bought from the same dealer show a lower vitality this year than they did last, which suggests the possibility that some of this year's seed may have been taken from last year's stock which was held over. At all events, the results indicate that too much ought not to be taken for granted concerning the vitality of seeds, especially when they have been carelessly stored for months. A man who plants bad seed not only loses the money he pays for it, but he loses the use of his land, the fertilizers and the labor wasted in trying to obtain a crop which he never grows. This bulletin well adds that with the struggle now going on to keep the cost of production below the market value of crops the vitality of seeds becomes an important question. Seed of low vitality tends to curtail the yield of a crop, not only because the entire area of the land is not utilized by it, but because it takes crops from such seed, in many cases, longer to mature on account of the lack of vigor in the young plant, and these two considerations so influence the receipts from a crop that it may not be sufficient to meet the expenses of growing it. The purchaser, therefore, ought to have some assurance that his seed is fresh and that it is properly kept, and the only way that such a guarantee can be had is in some agreement between the buyer and the seller by which the latter will regularly test his seed in bulk and furnish each purchaser with a truthful statement of the result of the test.